

a¹
orcl
where x is from 0 to 4, each of R₁₋₅ is independently selected from the group consisting of H, Me, Et, ^tBu, Ph, ⁱPr, CF₃, SiH₃, SiMe₃, Si(CF₃)₃, Si(Et)₃, Si(ⁱPr)₃, Si(^tBu)₃, Si(Ph)₃, Si(SiMe₃)_x(Me)_{3-x} and Cpⁿ is C₅H_xMe_(5-x) (where x = 0-5).

REMARKS

I. **Affirmation of Provisional Election; Cancellation of Claims 5-15 in Response to Examiner's Withdrawal of Same**

Applicants hereby affirm the election of Group I claims 1-4 and the single disclosed species (iv) that was provisionally made by the undersigned attorney on March 11, 1999.

The listing of all claims readable on the elected species (iv) is: claims 1, 2, 3 and 4.

Consistent with the Examiner's withdrawal of non-elected claims 5-15, such withdrawn claims have been cancelled herein. The requirements of 37 CFR §1.48(b) are noted, and no change in the originally stated inventorship for this application is required.

The cancellation of claims 5-15 herein is with express reservation of the right to file divisional application(s) directed to the subject matter thereof, during the pendency of the present application or a further divisional or continuation application based on and claiming the priority of the instant application.

II. Objection to the Informal Drawings for Figures 1-3

In response to the Notice of Draftsperson's Patent Drawing Review dated March 16, 1998 and accompanying the April 27, 1999 Office Action, wherein the informal drawings for Figures 1-3 were objected to in respect of the character of lines, numbers, letters and reference characters therein, request hereby is made for deferral of the requirement for filing formal drawings in the application, pending receipt of a Notice of Allowability. At the time of receipt of the Notice of Allowability, new formal drawings will be prepared and filed, complying with the requirements of 37 CFR 1.84.

III. Rejections of Claims 1-4 Under 35 USC 112, First Paragraph and Second Paragraph

Claims 1-4 have been rejected under 35 USC 112, first paragraph, on the grounds that the applicants have failed to disclose how to make the claimed compounds.

In response to the Examiner's statement about synthesis of the claimed tantalum amides, the specification teaches at page 19, line 13-15 that tantalum amides such as $Ta(NMe_2)_5$ are attractive precursors and at page 20, lines 4-9 that "substitution of one of the NMe_2 groups with $-N(CH_3)(CH_2)(CH_2)-NMe_2$ gives the tantalum amide composition of formula I" and that a "variety of tethered ligands may be similarly employed."

In the paragraph bridging pages 20 and 21 of the application, it is disclosed that the "use of β -diimmines offers alternative precursor compositions" and it is apparent that this refers, analogous

to the preceding discussion of formula I, to a reaction of the β -diimmine with the tantalum amide such as $Ta(NMe_2)_5$, to form the formula II composition.

Then, at page 21, lines 11-13, the discussion continues, to state that "the TaN precursor may utilize diamide ligands such as $N(R_1)(CH_2)_xN(R_2)$ to form mixed ligand complexes such as those of the formula $Ta(N(R_1)(CH_2)_xN(R_2))_x(NR_3R_4)_{5-2x}$, formula (III) below."

The aforementioned substitution reactions may also be used to functionalize the amide nitrogen atoms to form unsymmetrical amides of formula (iv), with the substituents described at page 22, lines 6-9 of the instant application.

The same tantalum amide starting material, $Ta(NMe_2)_5$, thus may be used and substitutionally functionalized to form the precursors of the invention.

Thus, the application states at page 22, lines 11-13 that "[t]he aforementioned precursors of the invention ... are easily and economically synthesized."

β -Ketoimines may be used as reactants to functionalize the tantalum starting material and form corresponding compounds of formula (v).

The cyclopentadienyl compound of formula (vi) as described at page 26, line 15 "has a hydride precursor structure" and is substitutionally reacted with a cyclopentadienyl compound to form the bisCp structure of formula.

The compounds of formulae (vii), (viii) and (ix) are suitably formed by the same synthesis technique disclosed at page 19, line 13-15 that tantalum amides such as Ta(NMe₂)₅ are attractive precursors and at page 20, lines 4-9 that “substitution of ... the NMe₂ groups” yields the corresponding compounds, with corresponding approach for titanium amides or titanium silylamides.

Claims 1-4 have also been rejected in the April 27, 1999 Office Action on 35 USC 112, second paragraph grounds, as failing to define the variable “x” in the formulae (vii) and (ix).

The variable x is unspecified in the formulae to encompass all permutations of the specified ligands. The variable x can therefore be from 0 to 5 in the case of tantalum as the metal central atom, and x is from 0 to 4, and can be more restrictively from 1 to 4, in the case of titanium as the metal central atom. Claim 1 has therefore been amended hereinabove to recite the corresponding ranges of value of x in each formula (tantalum compounds, x from 0 to 5, and titanium compounds, x from 1 to 4).

IV. Rejections of Claims 1-4 on Art Grounds, and Traversal Thereof

In the April 27, 1999 Office Action, the Examiner has rejected claims 1-4 on art grounds, including:

a rejection of claim 1 under 35 USC 102(b) as being unpatentable over Wilkinson U.S. Patent 3,288,829 (“Wilkinson”);

a rejection of claim 1 under 35 USC 102(b) as being unpatentable over Ovchinnikov et al., Organometallic Chemistry in the USSR, Vol. 5, No. 5, pp. 564-567 (1992) ("Ovchinnikov");

a rejection of claim 1 under 35 USC 102(b) as being unpatentable over Lappert et al., Metal and Metalloid Amides, John Wiley & Sons, pp. 470-543 ("Lappert");

a rejection of claim 1 under 35 USC 102(b) as being unpatentable over Shin et al., Chem. Mater., Vol. 9, pp. 76-80 (1997) ("Shin"); and

a rejection of claims 2-4 under 35 USC 103(a) as being unpatentable over Wilkinson.

These rejections of the claims 1-4 are traversed in respect of the claims as amended herein, and reconsideration of the amended claims in light of the ensuing remarks ("Arguments for Patentability") is requested.

V. Arguments for Patentability

In response to the rejections of the claims, claim 1 has been amended to more specifically delineate the applicants' invention over the art.

More specifically, in response to the citation of Wilkinson '829 as disclosing the bisCp compound of claim 1, claim 1 has been amended to recite in subparagraph (vi) that R in the cyclopentadienyl constituents of the recited tantalum cyclopentadienyl compound is

trimethylsilyl. Such substituted cyclopentadienyl tantalum compound is not taught or suggested in Wilkinson

In response to the rejection of claim 1 on the basis of the Ovchinnikov et al. reference, subparagraph (ix) has been amended to distinguish over such reference by introduction of the proviso that in the titanium compound, when R₄ and R₅ are each methyl, then R₁₋₃ are not all trimethylsilyl.

In response to the rejection of claim 1 on the basis of the Lappert et al. reference as describing the compound of formula (vii) wherein R₁ and R₂ are each methyl and R₃ and R₄ are each propyl, claim 1 has been amended to distinguish over such reference by introduction of the proviso that in the titanium compound, when R₁ and R₂ are each methyl, then R₃ and R₄ are not both propyl.

In response to the rejection of claim 1 on the basis of Shin et al., with the reference being cited against species (vii) and (ix) when x is 0, claim 1 has been amended in such subparagraphs by specifying x as an integer having a value from 1 to 4.

Concerning the rejection of claims 2-4 based on Wilkinson, claims 2-4 are of dependent form under claim 1. As discussed hereinabove, claim 1 has been amended herein to distinguish over Wilkinson, and claims 2-4 therefore are likewise patentable over the art, based on their dependence under patentably distinguishing claim 1.

In light of the foregoing, all 35 USC 112 rejections and 35 USC 102/103 rejections are now fully overcome.

VI. Conclusion

Based on all of the foregoing, all pending claims 1-4 are submitted to be fully patentably distinguished over the art and in form and condition for allowance.

In the event that any issues remain, the Examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same, in order that the application may be passed to allowance at an early date.

Respectfully submitted,



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